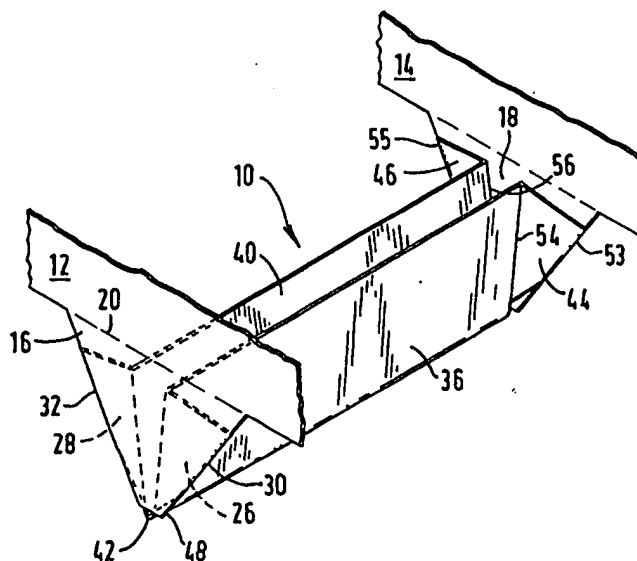




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: BEAM STRUCTURE FOR ARTICLE CARRIER



## (57) Abstract

An article carrier having a beam structure (10) is disclosed. The beam structure (10) bridges between a pair of opposed side walls (12, 14) of the carrier to support the packaged articles. The beam structure (10) comprises a pair of bracket panels (16, 18) extending downwardly from the side walls (12, 14), respectively, a pair of strips (36, 40) each extending between the bracket panels (16, 18), and a pair of gusset panels (26, 28) hingeably interconnecting each bracket panel (16, 18) with the strips (36, 40). The strips (36, 40) are hingeably connected together along their common lower side edge to form a beam of a substantially V-shaped cross section. Each bracket panel (16, 18) is disposed in a face-to-face relationship with the gusset panels (26, 28) of the respective pair, and a lower end portion of each bracket panel (16, 18) is severed by a cut (48, 50, 52) from the adjacent portions of the beam structure (10).

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## BEAM STRUCTURE FOR ARTICLE CARRIER

Background of the Invention

The present invention relates to an improved beam structure used to interlock articles such as so-called  
5 brick packages or interconnected cups or pots. Such groupings may constitute a single pair or any other desired arrangement such as two rows of two packages each, two rows of three, four or five packages each or greater number of rows of a desired number of containers. Ordinarily, such  
10 containers are smaller than an ordinary drinking glass and in order to provide for efficient handling during shipment and displays in retail outlets, it is desirable to stack the articles in tiers one above the other.

This invention relates particularly to a new beam  
15 structure which interconnects carrier side walls at their lower end. Previous beams have been constructed to form a "U-shaped" beam as highlighted in U.S. Patent No. 3,861,530, or French Patent No. 7811397. A further type of beam construction is that known as a "flat shape" beam.  
20 This can be found in U.S. Patent No. 2,764,284.

The problem with the U-shaped beam structure is that two folds are required along the lower end of the beam which increases the complexity of construction. The main problem associated with the flat-shape beam structure is  
25 the concentration of the score lines to one particular point, which is undesirable.

Summary of the Invention

The present invention has overcome the difficulties associated with the previous types of beam, by  
30 providing a cut line to relieve the stresses caused by a concentration of score lines as well as to facilitate the beam formation.

In accordance with one aspect of the invention there is a beam structure of a carrier for packaging a  
35 plurality of articles. The beam structure bridges between

opposed carrier side walls to be interposed between the articles and further to support the articles. The beam structure comprises a pair of bracket panels extending downwardly from the side walls, a pair of strips each  
5 extending between the bracket panels, a pair of gusset panels hingeably interconnecting each bracket panel with the strips. The strips are hinged along their common lower side edge to form a beam of a substantially V-shaped cross-section. Each bracket panel is disposed in a face to face  
10 relationship with the gusset panels of the respective pair. The lower end portion of each bracket panel is severed by a cut from the adjacent portions of the beam structure.

In one optional feature of this aspect of the invention, the beam formed from the strips is provided at  
15 each end thereof with the respective pair of gusset panels so that each end of the beam is hingeably connected to the each bracket panel.

In another optional feature of this aspect of the invention, each bracket panel is hingeably connected along  
20 its opposing side edges to the gusset panels of the respective pair, the side edges of each bracket panel is disposed generally perpendicular to each other, and the cut extends partially along the side edges of each bracket panel.

In a further optional feature of this aspect of the invention, each bracket panel is substantially  
25 trapezoidal in shape and is hingeably connected along its opposing oblique side edges to the gusset panels of the respective pair, and the cut extends entirely along a  
30 shorter edge of said each bracket panel.

In yet a further optional feature of this aspect of the invention, the strips define therebetween an acute angle to facilitate formation of said beam.

A second aspect of the invention provides a  
35 carrier for packaging a plurality of articles. The carrier comprises a pair of opposed side walls, and the above beam structure of the first aspect.

A third aspect of the invention provides a blank for forming the above article carrier of the second aspect.

The objects and advantages of the present invention will be apparent from the following description, the accompanying drawings and the appended claims.

#### Brief Description of the Drawings

In the drawings:

FIGURE 1 shows the beam structure formed from the carrier blank, according to the invention;

FIGURE 2 shows a plan view of one end of the beam structure according to the invention shown in Figure 1; and

FIGURE 3 shows a cross-sectional view of the beam structure as shown in Figure 2.

#### Detailed Description of the Preferred Embodiment

As illustrated in Figure 1, there is shown part of a carrier for forming a beam structure 10 attached to a carrier for packaging a plurality of horizontally arranged articles. The carrier is made from paperboard or similar foldable sheet material. The beam structure 10 extends between opposed carrier side walls 12, 14, and comprises a pair of oppositely disposed bracket panels 16, 18 hingeably connected to respective one of said side walls 12, 14.

Part of the carrier blank for forming one end of the beam structure 10 is shown in Figure 2. It comprises a bracket panel 16 hingeably connected along its upper edge to carrier side wall 12 along fold line 20. In this embodiment, the bracket panel 16 is substantially trapezoidal in shape. The bracket panel 16 is hinged along each of its opposing side edges 22, 24 to one of a pair of substantially triangular gusset panels 26, 28 along fold lines 30, 32 respectively. Gusset panel 26 is foldably connected along fold line 34 to a support panel 36. Likewise, gusset panel 28 is foldably connected along fold line 38 to a second support panel 40. First and second support panels 36, 40 are foldably connected together along

their common side edge by fold line 42 and are connected to gusset panels 44, 46 at the opposite end of the beam structure 10, shown in Figure 1.

Each gusset panel 26, 28 is partially separated  
5 from bracket panel 16 by cut lines 48, 50 respectively which extend from fold lines 30, 32 respectively to the intersections of fold lines 34 and 38. Another cut line 52 separates bracket panel 16 from support panels 36, 40 and extends between cut lines 48 and 50 respectively.

10 The opposite end of beam structure 10 comprises a bracket panel 18 and gusset panels 44, 46 hingeably connected to bracket panel 18 and the other end of first and second support panels 32, 34. The above-mentioned  
15 panels 18; 44, 46 are in symmetrically opposite positions to bracket panel 16 and gusset panels 26, 28 and are of similar construction and not therefore more specifically described.

Turning to the construction of the carrier and in particular the beam structure 10, shown in Figure 1, the  
20 carrier is part erected to provide a pair of oppositely disposed side walls 12, 14. The bracket panels 16, 18 are hingeably connected to opposed carrier side walls 12, 14 such that the beam structure 10 is formed below the side walls 12, 14. The beam structure 10 is constructed by  
25 folding first and second support panels 36, 40 along their common fold line 42 and into an angular relationship with each other. Gusset panels 26, 28 folded into a face to face relationship with bracket panel 16 along fold line 30, 32. Likewise, gusset panels 44, 46 are folded in a face to  
30 face relationship with bracket panel 18 along fold lines 53, 55 respectively. The expression "face to face relationship" as used herein refers to either the arrangement wherein each gusset panel is in contact with the respective bracket panel face to face or the  
35 arrangement wherein each gusset panel is opposed to the respective bracket panel face to face with a space therebetween. In a face to face contacting relationship,

each gusset panel 26, 28; 44, 46 may be attached to the respective bracket panel 16, 18 by glue or other means known in the art.

Each pair of gusset panels 26, 28; 44, 46 are  
5 folded about fold lines 36, 38; 54, 56 and are thereby brought into a substantially perpendicular arrangement with support panels 36, 40, to form the beam structure 10, shown in Figure 1. The other panels of the carrier can be placed in a set up condition such that the beam structure is able  
10 to receive and support at lip portion at least one article by the upper edges of support panels 36, 40.

As shown in Figure 1, the beam structure 10 extends between opposed carrier side walls 12, 14 enabling the structure to be interposed between articles and further  
15 to support the articles. The beam structure 10 comprises bracket panels 16, 18 extending downwardly from side walls 12, 14 and pairs of gusset panels 26, 28; 44, 46 hingeably connected with said bracket panels 16, 18 to form face to face relationship. Strips 36, 40 extend between and are  
20 hingeably connected to the gusset panels 26, 28; 44, 46. The strips 36, 40 are hinged along their common lower side edge 42 to form a beam of a substantially V-shaped cross-section, the lower end portion of each bracket panel 16, 18 being severed by a cut 48, 50, 52 from the adjacent  
25 portions of said beam structure 10.

Figure 3 illustrates part of the forming tool "T" used to fold the support panels 36, 40 along the fold line 42 and also illustrates a relief angle  $\alpha$  formed between the support panels 36, 40. The relief angle  $\alpha$  facilitates the  
30 engagement and disengagement of the forming tool "T" upon formation of the beam structure 10. To form the beam structure 10, the forming tool "T" is moved in the direction "A" as indicated in Figure 3. Cut lines 48, 50 and 52 separate the lower end portion of the bracket panel  
35 16 from the gusset panels 26, 28 as well as from the support panels 36, 40. It will be appreciated by those skilled in the art that the relief angle  $\alpha$  can be altered

by moving fold lines 30, 32; 34, 38 and/or cut lines 48, 50 or 52 according to particular requirements of the beam structure 10. The bracket panels 16, 18 are not necessarily trapezoidal in shape but may be triangular, pentagonal, or hexagonal. The positioning of cut lines 48, 50, 52 can be altered to any desired position in order to provide relief to the stresses caused by the concentration of fold lines. However, it is preferred that the relief angle  $\alpha$  is kept small enough to allow smooth introduction of articles into the carrier. A beam structure with a too wide relief angle would interfere with the articles to be loaded into the carrier. A preferred relief angle is an acute angle less than thirty (30) degrees.

The present invention and its preferred embodiment relates to a beam structure in a top gripping carrier which is shaped to provide satisfactory strength to hold at least one article securely but with a degree of flexibility so that the load transferred to the beam structure is absorbed by a carrier. The shape of the blank minimizes the amount of paperboard required. The carrier can be applied to an array of articles by hand or automatic machinery. It is anticipated that the invention can be applied to a variety of carriers including, but not limited to, those disclosed in U.S. Patent Nos. 2,764,284; 2,823,063; 2,823,064; 3,861,530; and 5,682,996 and French Patent No. 7811397 which patents are hereby incorporated by reference.



CLAIMS

1. A beam structure of a carrier for packaging a plurality of articles, said beam structure bridging between a pair of opposed side walls of said carrier to support said articles, said beam structure comprising:
- 5 a pair of bracket panels extending downwardly from said side walls respectively;
- a pair of strips each extending between said bracket panels; and
- 10 a pair of gusset panels hingeably interconnecting each of said bracket panels with said strips,
- said strips being hingeably connected together along a common lower side edge thereof to form a beam of a substantially V-shaped cross-section, said each bracket
- 15 panel being disposed in a face to face relationship with said gusset panels of a respective pair, a lower end portion of said each bracket panel being severed by a cut from adjacent portions of said beam structure.
2. A beam structure according to claim 1, wherein
- 20 said beam formed from said strips is provided at each end thereof with said respective pair of said gusset panels so that said each end of said beam is hingeably connected to said each bracket panel.
3. A beam structure according to claim 1 wherein
- 25 said each bracket panel is hingeably connected along opposing side edges thereof to said gusset panels of said respective pair, said side edges of said each bracket panel being disposed generally perpendicular to each other.
4. A beam structure according to claim 3 wherein
- 30 said cut extends partially along said side edges of said each bracket panel.
5. A beam structure according to claim 1, wherein said each bracket panel is substantially trapezoidal in

shape and is hingeably connected along opposing oblique side edges thereof to said gusset panels of said respective pair, and said cut extends entirely along a shorter edge of said each bracket panel.

5 6. A beam structure according to any of the preceding claims wherein said strips define therebetween an acute angle to facilitate formation of said beam.

7. A carrier for packaging a plurality of articles, said carrier comprising a pair of opposed side walls, and  
10 a beam structure bridging between said side walls to support said articles, said beam structure comprising:

a pair of bracket panels extending downwardly from said side walls respectively;

15 a pair of strips each extending between said bracket panels; and

a pair of gusset panels hingeably interconnecting each of said bracket panels with said strips,

20 said strips being hingeably connected together along a common lower side edge thereof to form a beam of a substantially V-shaped cross-section, said each bracket panel being disposed in a face to face relationship with said gusset panels of a respective pair, a lower end portion of said each bracket panel being severed by a cut from adjacent portions of said beam structure.

25 8. A blank for forming an article carrier having a beam structure of a substantially V-shaped cross-section, said blank comprising:

a pair of spaced carrier side walls;

30 a pair of bracket panels extending toward each other from said side walls respectively;

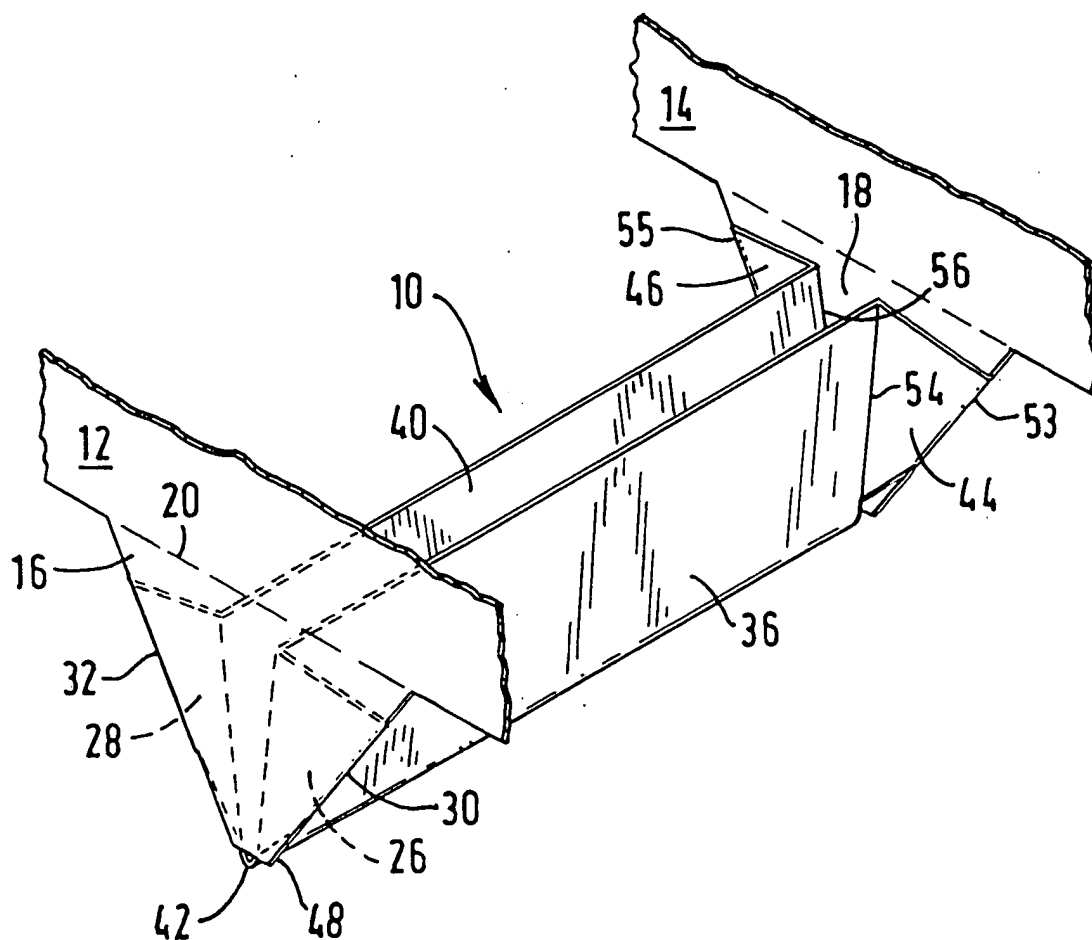
a pair of strips each extending between said bracket panels; and

a pair of gusset panels hingeably interconnecting each of said bracket panels with said strips,

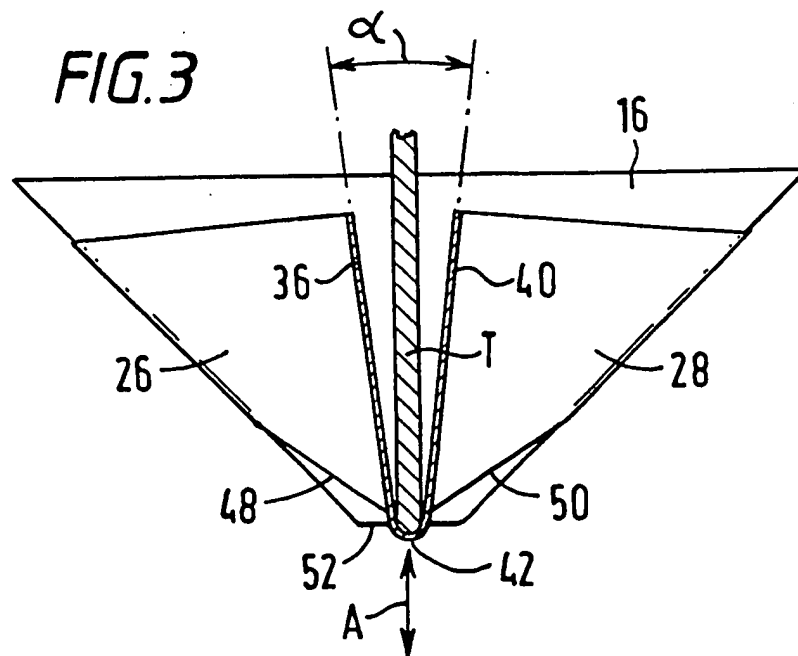
said strips being hingeably connected together along a common side edge thereof to form said beam structure, a portion of said each bracket panel is severed by a cut from said gusset panels of a respective pair.

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FIG. 1



**FIG. 2**



# INTERNATIONAL SEARCH REPORT

In tional Application No

PCT/US 98/01235

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D71/46 B65D5/48

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 127 304 A (GARDNER) 28 November 1978 see column 1-2; figures 1-6 ---	1-8
A	US 2 764 284 A (ARNESON) 25 September 1956 cited in the application ---	
A	FR 2 423 399 A (THE MEAD CORP.) 16 November 1979 cited in the application -----	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 2764284 A	25-09-56	NONE	
FR 2423399 A	16-11-79	BE 875665 A	16-08-79
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